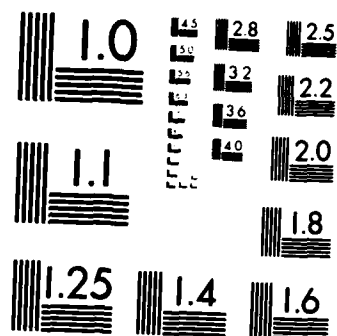


AD-A147 382 THEORY AND APPLICATIONS OF TWO-PHOTON QUANTUM OPTICS 1/1
(U) NORTHWESTERN UNIV EVANSTON IL DEPT OF ELECTRICAL
ENGINEERING AND COMPUTER SCIENCE H P YUEN 29 OCT 84
UNCLASSIFIED N00014-82-K-0631 F/G 20/6 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

12

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 1	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Theory and Applications of Two-Photon Quantum Optics - Annual Summary		5. TYPE OF REPORT & PERIOD COVERED Annual Summary Oct 83 - Sept 84
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Horace P. Yuen		8. CONTRACT OR GRANT NUMBER(s) N00014-82-K-0631
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Electrical Engineering & Computer Science, Northwestern University Evanston, IL 60201		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 6115-3N, RR011-0702 NR396-057
11. CONTROLLING OFFICE NAME AND ADDRESS Physics Division, Office of Naval Research Arlington, Virginia 22217		12. REPORT DATE October 29, 1984
		13. NUMBER OF PAGES 5
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release: distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Quantum Optics		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Annual summary on two-photon quantum optics.		

DTIC

NOV 09 1984

✓

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

5-N 0102-LF-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

84 11 05 099

AD-A147 382

DTIC FILE COPY

October 1984

ANNUAL SUMMARY REPORT

Theory and Applications of Two-Photon Quantum Optics

412: HSP:
NR396-057

Principal Investigator:

Horace P. Yuen
Professor of Electrical Engineering and Computer Science
Northwestern University
Evanston, Illinois 60201

Scientific Problem:

The basic problem is to discover an optical system which yields large readily observable squeezing. Another main goal is to explore the possible utilization of squeezing, both in precision physics measurements and in practical technological applications.

Approach:

The discovery of optical systems exhibiting large observable squeezing is being attempted in two ways. The first consists of a general operator analysis on the mechanism of squeezing generation, to explore possible novel optical systems that may yield large squeezing. In the second method, new quantum optics techniques are developed for detailed analysis of coupled matter-field systems that are known to exhibit squeezing, in order to understand how certain imperfections in real systems can be overcome.

Progress:

A multimode TCS formalism has been developed for identifying squeezing in an optical system. The possibility of generating readily observable squeezing in feedback type systems is being investigated, which looks promising and significant. A general theory for characterizing squeezed states in contradistinction with two-photon coherent states has been obtained.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification <i>per R. Matthews</i>	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	

OFFICE OF NAVAL RESEARCH

PUBLICATIONS / PATENTS / PRESENTATIONS / HONORS REPORT

for

1 October 1983 through 30 September 1984

for

Contract N00014-82-K-0631

Task No. NR 396-057

THEORY AND APPLICATIONS OF TWO-PHOTON QUANTUM OPTICS

Horace P. Yuen
Professor of Electrical Engineering and Computer Science
Northwestern University
Evanston, IL 60201

Reproduction in whole, or in part, is permitted for any purpose of the United States Government.

* This document has been approved for public release and sale; its distribution is unlimited.

PAPERS PUBLISHED IN REFEREED JOURNALS

- (i) H. P. Yuen, "Respond to Comments by K. Wodkiewicz," Physical Review Letters, Vol. 52, 1984, p. 788.
- (ii) H. P. Yuen, "Respond to Comments by R. Lynch," Physical Review Letters, Vol. 52, 1984, p. 1730.

BOOKS (AND SECTIONS THEREOF) SUBMITTED FOR PUBLICATION

N/A

BOOKS (AND SECTIONS THEREOF) PUBLISHED

in Coherence and Quantum Optics V, ed. by L. Mandel and E. Wolf, Plenum, N.Y., 1984.

- (i) P. Tombesi and H. P. Yuen, "Enhanced Squeezing in an Optically Bistable Two-Photon Medium," pp. 751-754.
- (ii) H. P. Yuen, "On the Observation of Squeezing and Sub-Poissonian Photon Statistics by Homodyne Detection," pp. 755-760.

INVITED PRESENTATIONS AT TOPICAL OR
SCIENTIFIC/TECHNICAL SOCIETY CONFERENCES

H. P. Yuen, "Squeezing and Its Applications," presented at U.S.- Japan Seminar on Coherence, Incoherence, and Chaos in Quantum Electronics, August 30 - September 4, 1984, Nara, Japan; pp. 39-41 of seminar program.

HONORS/AWARDS/PRIZES

N/A

END

FILMED

12-84

DTIC